

CLAIMS

We claim:

1. A materials set for use in 3DP by deposition of a binder liquid onto a bed of powder, wherein the powder comprises:

a bulk powder substance; and

a migration control substance distributed within the bulk powder substance, the migration control substance soluble by the binder liquid wherein the migration control substance absorbs the binder liquid and forms a gel.

2. The materials set of claim 1, wherein the migration control substance swells when it absorbs the binder liquid.

3. The materials set of claim 1, wherein the bulk powder substance, the migration control substance and the binding liquid are all edible.

4. The materials set of claim 1, wherein the binder liquid includes water and the migration control substance is selected from the group consisting of cornstarch, starch, hydroxypropylmethyl celluloses, polyvinyl alcohols, polyoxyethylene oxides, polyethylene glycols, hydrophilic silica gel, xantham gum, gellan gum, locust bean gum, acrylic acid polymers, gelatin, sodium carboxymethyl cellulose, methylcellulose, guar gum, sodium alginate, and polyethylene-polypropylene copolymer.

5. The materials set of claim 1, wherein the binder liquid includes ethanol and the migration control substance is selected from the group consisting of polyethylene glycols, polyethylene-polypropylene copolymers, polyoxyethylene alkyl ethers, polyvinyl pyrrolidones, and hydroxypropylmethylcellulose.

6. The materials set of claim 1, wherein the bulk powder substance is selected from the group consisting of lactose, other sugars, microcrystalline cellulose, hydroxypropylmethylcellulose, methacrylic ester copolymers, or a pharmaceutical excipient.

7. The materials set of claim 1, wherein the particles of the bulk powder substance comprise at least approximately 60% by weight of the powder.

8. The materials set of claim 1, wherein the particles of the migration control substance have an average particle size of less than approximately 38 microns.

9. The materials set of claim 1, wherein either the binder liquid or the bulk powder substance or the migration control substance comprises an active pharmaceutical ingredient.

10. The materials set of claim 1, wherein the binder liquid further comprises suspended solid particles.

11. A materials set for use in 3DP by deposition of a binder liquid onto a bed of powder, comprising:

liquid binder including a binding substance dissolved therein;

a bulk powder substance; and

a migration control substance intermixed with the bulk powder substance, the migration control substance dissolves in the binder liquid making a resulting solution which is more viscous than the binder liquid.

12. The materials set of claim 11, wherein the binder liquid includes water and the migration control substance is polyvinyl pyrrolidone.

13. The materials set of claim 11, wherein the binder liquid includes ethanol and the migration control substance is methacrylate or methacrylic ester copolymer.

14. The materials set of claim 11, wherein the migration control substance and the binding substance are the same substance.

15. The materials set of claim 11, wherein either the binder liquid or the bulk powder substance or the migration control substance includes an active pharmaceutical ingredient.

16. The materials set of claim 11, wherein the binder liquid further includes suspended solid particles.

17. A method of manufacturing a dosage form by 3DP, comprising:
depositing a layer of powder, wherein the powder includes particles of a bulk powder substance and particles of a migration control substance;
depositing onto the powder in selected places a binder liquid, wherein the binder liquid comprises a binding substance dissolved in it and wherein the migration control substance absorbs the binder liquid, thereby inhibiting migration of the binder liquid; and
repeating the above steps as many times as needed to manufacture the dosage forms.

18. A method of manufacturing a part by 3DP, comprising the steps of:
depositing a layer of powder wherein the powder includes particles of a bulk powder substance and particles of a migration control substance;
depositing onto the powder in selected places a binder liquid, wherein the migration control substance dissolves in the binder liquid making a resulting solution which is more viscous than the binder liquid; and

repeating the above steps as many times as needed to manufacture the part.

19. A method of controlling binder migration in three-dimensional printing, comprising:

depositing a layer of powder;

depositing a first binder liquid on the layer of powder; and

depositing a second binder liquid on the layer of powder immediately adjacent to the first binder liquid, wherein the first binder liquid provides a migration control barrier on the side adjacent to the second binder liquid.

20. The method of claim 19, wherein the first binder includes an auxiliary filler substance dissolved in it.

21. The method of claim 20, further including, allowing the first binder to substantially dry prior to depositing the second binder liquid.

22. The method of claim 19, wherein the first binder liquid includes as a solute an auxiliary filler substance which in solid form is more hydrophobic than the powder.

23. The method of claim 19, wherein the first binder liquid is an ethanol-based liquid and the second binder liquid is an aqueous liquid.

24. The method of claim 19, wherein the powder includes a migration control powder.